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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/933,315	08/20/2001	Erik V. Johnson	14210BAUS02U	7049

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STEUBING AND MCGUINESS & MANARAS LLP
125 NAGOG PARK
ACTON, MA 01720

EXAMINER	
LAVARIAS, ARNEL C	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/933,315	JOHNSON ET AL.	
	Examiner	Art Unit	
	Arnel C. Lavarias	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/4/04,7/13/04*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) *5-11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendments to Claims 1-4 in the submission filed 10/4/04 are acknowledged and accepted. In view of the amendments made above, the provisional rejection of Claim 1 in Section 11 of the Office Action dated 2/11/04 is respectfully withdrawn.

Election/Restrictions

2. In the Office Action dated 10/10/02, Claim 1 was previously indicated to be a linking claim linking Inventions I, II, and III. However, Claim 1 (as well as Claims 2-4) was amended in the submission filed 10/4/04. In view of these amendments, the disposition of the pending claims are now as follows:

I. Claims 1-4, drawn to an optical logic device wherein the at least one stable, non-absorbing optical hard limiter comprises alternating layers of materials and wherein the transmitted and reflected characteristics are defined in Claims 3 and 4, respectively.

II. Claim 5, drawn to an optical gain element comprising a first, a second, and a third stable, non-absorbing optical hard limiter.

III. Claims 6-11, drawn to the various optical AND, OR, XOR, NOT, NAND, and NOR gates based on stable, non-absorbing optical hard limiters.

Currently, no claims link the various inventions.

3. Claims 1-4, directed to the elected invention (See Applicants' response to the restriction requirement submitted 11/4/04), will be examined on the merits.

Oath/Declaration

4. The supplemental oath/declaration filed 7/13/04 as part of a petition to correct inventorship under 37 CFR 1.48(a) is acknowledged and accepted.

Inventorship

5. In view of the papers filed 7/13/04, it has been found that this nonprovisional application, as filed, through error and without deceptive intent, improperly set forth the inventorship, and accordingly, this application has been corrected in compliance with 37 CFR 1.48(a). The inventorship of this application has been changed by the addition of inventor Lukasz Brzozowski.

The application will be forwarded to the Office of Initial Patent Examination (OIPE) for issuance of a corrected filing receipt, and correction of Office records to reflect the inventorship as corrected.

Response to Arguments

6. The Applicants' arguments filed 7/13/04 and 10/4/04 with respect to the rejections of Claims 1-4 in Sections 15-16 of the Office Action dated 2/11/04 have been fully considered but they are not persuasive. As noted above, the Applicants' petition to correct the inventorship under 37 CFR 1.48(a) is acknowledged and approved. However, the change in inventorship of the instant

application does not overcome the rejection of Claim 1 (as well as Claims 2-4) under 35 U.S.C. 102(a). 35 U.S.C. 102(a) specifically states that 'A person is entitled to a patent unless – (a) the invention was known or used *by others* in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, ...' (Emphasis added; See specifically MPEP 2132). The inventive entity of the current application is Erik V. Johnson, Edward H. Sargent, and Lukasz Brzozowski. The entity of the Brzozowski et al. reference is Lukasz Brzozowski and Edward H. Sargent. Because the inventive entity of the instant application is different from the entity of the Brzozowski et al. reference, the rejection of Claim 1 (as well as Claims 2-4) is proper under 35 U.S.C. 102(a).

7. The Applicants' arguments, see specifically Pages 3-5 of the Applicants' remarks, filed 7/13/04, with respect to the rejections of Claims 1-2 over the teachings of Smith, Cuykendall et al., Salehi et al., and Kahn have been fully considered and are persuasive. The rejections of Claims 1-2 in Sections 17-19 of the Office Action dated 2/11/04 have been withdrawn.

8. Claims 1-4 are now rejected as follows.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937,

214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1-4 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1, 3-6 of copending Application No. US2002/0195208 A1 in view of Cuykendall '366 (U.S. Patent No. 4926366).

Although the conflicting claims are not identical, they are not patentably distinct from each other because Claims 1, 3-6 of Application No. US2002/0195208 A1 similarly disclose optical logic devices based on stable, non-absorbing optical hard limiters (See Claim 1, 3, 6), wherein the limiter comprises alternating layers of materials with different linear indices and oppositely signed Kerr coefficients (See Claim 1, 3); and the transmitted characteristics and the reflected characteristics comprise the limitations as recited in Claims 3 and 4, respectively (See Claims 4 regarding the transmitted characteristics, Claim 5 regarding the reflected characteristics). Although copending Application No. US2002/0195208 A1 does not specifically disclose the optical logic devices being integrated, Cuykendall '366 teaches conventional optical logic devices, specifically all optical thin film computing circuits for optical logic and switching applications (See Abstract; Figures 3-4, 6, 8-14; col. 1, lines 5-50). Additionally, Cuykendall '366 teaches that such devices may be integrated using thin film

technology. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the optical logic devices be integrated to provide high flexibility in the optical design, as well as reduce the size and weight of the optical logic devices.

This is a provisional obviousness-type double patenting rejection.

11. Applicant is advised that should Claim 1 be found allowable, Claim 3 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

12. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

13. Claims 1-4 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In the instant case, each of Claims 1-4 recites an *integrated* optical logic device. However, the specification of the disclosure does not specifically disclose

the optical logic devices as being integrated optical logic devices. Additionally, the term 'integrated', as used in the instant claims, has not been previously defined, and thus, it is not known in what sense the optical logic devices are integrated.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claims 1-3, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Brzozowski et al. (L. Brzozowski, E. H. Sargent, "Photonic crystals for integrating optical computing", June 2000.), of record, in view of Cuykendall '366.

Brzozowski et al. discloses an optical logic device for processing information optically using the transmitted and/or reflected characteristics of at least one stable, non-absorbing optical hard limiter (See Page 3, Section II; Pages 6-7, Section IIId; Figure 9), wherein the optical hard limiter comprises alternating layers of materials with different linear indices and oppositely signed Kerr coefficients (See Figure 1; Page 3, Section II). Brzozowski et al. additionally discloses the transmitted characteristics of the hard limiter comprising a first range, a second range, and a third range, the ranges being defined as recited in Claims 1 and 3 of the instant application (See Figures 6, 7; Page 3, Section II;

Page 4-5, Section IIIa). Although Brzozowski et al. does not specifically disclose the optical logic devices being integrated, Cuykendall '366 teaches conventional optical logic devices, specifically all optical thin film computing circuits for optical logic and switching applications (See Abstract; Figures 3-4, 6, 8-14; col. 1, lines 5-50). Additionally, Cuykendall '366 teaches that such devices may be integrated using thin film technology. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the optical logic devices be integrated to provide high flexibility in the optical design, as well as reduce the size and weight of the optical logic devices.

16. Claim 4, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Brzozowski et al. in view of Cuykendall '366.

Brzozowski et al. in view of Cuykendall '366 discloses the invention as set forth above in Claims 1-3. Further, Brzozowski et al. inherently discloses the optical logic device wherein the reflected characteristics of the hard limiter comprise a first range, a second range, and a third range as recited in Claim 4 of the instant application (See Figures 6-7 for the transmitted characteristics of the hard limiter). Inherently, by the law of conservation of energy, the input intensity to the hard limiter must equal the sum of the energy absorbed, reflected, and transmitted by the hard limiter. Since the hard limiter is ideally a non-absorbing hard limiter, the input energy equals the sum of the output energy that is reflected and transmitted. Figure 6 of Brzozowski et al. discloses the transmitted energy as a function of the input energy. The reflected energy is therefore calculated as (input energy – transmitted energy), and this reflected energy is therefore plotted

as a function of input energy as well, leading to the claimed characteristics as recited in Claim 4 of the instant application. Further, it would have been obvious to one skilled in the art at the time the invention was made to have the reflected characteristics of the hard limiter include the claimed characteristics as recited in Claim 4 of the instant application, since it has been held that discovering an optimum value of a result effective variable involved only routine skill in the art. One would have been motivated to have the reflected characteristics of the hard limiter include the claimed characteristics as recited in Claim 4 of the instant application for the purpose of adjusting the dynamic range of the hard limiter based on the refractive indices of the two materials used in the hard limiter. *In re Antoine, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).* See also *In Re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).*

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5483340 to Webb et al.

Webb et al. is being cited to evidence an interferometer system (See Figure 2) that may be usable in optical logic systems. The interferometer includes transmission and reflection characteristics similar, but not exact, to that of the instant invention (See in particular Figure 3).

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See

MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 8:30 AM - 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Arnel C. Lavarias
12/1/04

THONG NGUYEN
PRIMARY EXAMINER
GROUP 2800